

WE CLAIM:

1. A water treatment device, comprising filtration media containing a volume of grains wherein between about 1 and 15 vol % of the grains have a grain size in a range between a first grain size and a second grain size, a first portion of the grains have grain sizes smaller than the first grain size, and a second portion of the grains have grain sizes larger than the second grain size.

2. The device of Claim 1 wherein the first grain size is between about 50 and 100 μm and the second grain size is between about 100 and 150 μm .

3. The device of Claim 1 wherein the first grain size is between about 70 and 90 μm and the second grain size is between about 100 and 130 μm .

4. The device of Claim 1 wherein a difference between the first grain size and the second grain size is at least 20 μm .

5. The device of Claim 1 wherein a difference between the first grain size and the second grain size is at least 10 μm .

6. The device of Claim 1 wherein the first portion is between about 10 and 50 vol%.

7. The device of Claim 1 wherein the second portion is between about 10 and 50 vol%.

8. The device of Claim 1 wherein the first portion is between about 35 and 50 vol%.

9. The device of Claim 1 wherein the second portion is between about 35 and 50 vol%.

10. The device of Claim 1 wherein the filtration media are selected from the group consisting of activated carbon, carbonized synthetic materials, hydrophobic polymeric adsorbants, activated alumina, activated bauxite, ceramic particles, fuller's earth, diatomaceous earth, silica gel, calcium sulfate, zeolite particles, inert particles, sand, surface charge-modified particles, metal oxides, metal hydroxides, and combinations thereof.

11. The device of Claim 1 wherein the device has a superficial contact time less than 2.1 seconds.

12. The device of Claim 11 wherein the device can reduce a lead concentration of 150 ppb in influent water to no more than 10 ppb.

13. The device of Claim 12 wherein the device can reduce a chloroform concentration of 450 ppb in influent water to no more than 80 ppb.

14. A water treatment device, comprising active filtration media containing a volume of grains wherein a first portion of the grains has grain sizes between about 100 and 200 μm , and makes up between about 10 and 50 vol % of the volume, a second portion of the grains has grain sizes between about 1 and 70 μm , and makes up between about 10 and 50 vol % of the volume, and a third portion of the grains has grain sizes between the largest of the first portion and the smallest of the second portion and makes up between about 1 and 15 vol % of the volume.

15. The device of Claim 14 wherein the volume of the grains is between about 10 and 100 cm^3 .

16. The device of Claim 15 wherein the volume of the grains is between about 10 and 50 cm^3 .

17. The device of Claim 14 wherein the filtration media have the form of a porous composite block.

18. The device of Claim 17 wherein the porous composite block has an external surface area between about 50 and 75 cm^2 .

19. The device of Claim 18 wherein the porous composite block is capable of removing from water at least 99.95% of particulates greater than 3 μm in size.

20. The device of Claim 14 wherein the device has a superficial contact time less than 2.1 seconds.

21. The device of Claim 20 wherein the device can reduce a lead concentration of 150 ppb in influent water to no more than 10 ppb and can reduce a chloroform concentration of 450 ppb in influent water to no more than 80 ppb.

22. The device of Claim 14 wherein the active filtration media are selected from the group consisting of activated carbon, carbonized synthetic materials, hydrophobic polymeric adsorbants, activated alumina, activated bauxite, ceramic particles, fuller's earth, diatomaceous earth, silica gel, calcium sulfate, zeolite particles, inert particles,

sand, surface charge-modified particles, metal oxides, metal hydroxides, and combinations thereof.

23. A system for treating water, comprising:

a housing having an inlet and an outlet;

source water capable of being in fluid communication with the inlet;

a filter component within the housing, the filter component comprising filtration media containing a volume of grains wherein between about 1 and 15 vol % of the grains have a grain size in a range between a first grain size and a second grain size, a first portion of the grains have grain sizes smaller than the first grain size, and a second portion of the grains have grain sizes larger than the second grain size, the filter component capable of having fluid communication with the source water; and

a plurality of fluid paths within the filtration media wherein the source water can flow along the fluid paths and be treated by the filtration medium, whereby the source water becomes treated water, the treated water capable of being in fluid communication with the outlet.

24. The system of Claim 23 wherein the first grain size is between about 50 and 100 μm and the second grain size is between about 100 and 150 μm .

25. The system of Claim 23 wherein the first grain size is between about 70 and 90 μm and the second grain size is between about 100 and 130 μm .

26. The system of Claim 23 wherein a difference between the first grain size and the second grain size is at least 20 μm .

27. The system of Claim 23 wherein a difference between the first grain size and the second grain size is at least 10 μm .

28. The system of Claim 23 wherein the first portion is between about 10 and 50 vol%.

29. The system of Claim 23 wherein the second portion is between about 10 and 50 vol%.

30. The system of Claim 23 wherein the first portion is between about 35 and 50 vol%.

31. The system of Claim 23 wherein the second portion is between about 35 and 50 vol%.

32. The system of Claim 23 wherein the filter component has a superficial contact time less than 2.1 seconds.

33. The system of Claim 32 wherein a lead concentration of 150 ppb in the source water can be reduced to no more than 10 ppb in the treated water.

34. The system of Claim 33 wherein a chloroform concentration of 450 ppb in the source water can be reduced to no more than 80 ppb in the treated water.

35. The system of Claim 23 wherein the system is selected from the group consisting of pour-through pitchers and carafes, faucet-mount systems, counter top water dispensers, water dispensers suitable for use in refrigerators, water coolers with and without heating modules, portable filtered drinking devices such as water bottles, and various beverage making apparatus.